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A role for universal pension?

Simulating universal pensions in Ecuador, Ghana, Tanzania, and South Africa

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Abstract: We use four novel, cross-country comparable tax-benefit microsimulation models for Ecuador, Ghana, Tanzania, and South Africa to evaluate ex ante the expansion of a universal old-age pension in a static setting. Universal pensions would significantly reduce poverty and inequality in settings in which no means-tested old-age pensions exist (such as Ghana and Tanzania). If means-tested old-age pensions exist and shall be maintained, universal pensions as a top-up scheme only make a difference for the income distribution if the existing schemes do not reach the entire vulnerable population, such as in Ecuador. Costs for the proposed schemes are substantial.

Keywords: old-age benefit, poverty, SOUTHMOD, tax-benefit microsimulation
JEL classification: H55, I32, C15

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1 Introduction

In developed countries, static tax-benefit microsimulation models are readily available and are common tools for evaluating public policies. For developing countries, by contrast, microsimulation models rarely exist. Therefore, the previous literature using microsimulation models is concentrated on Europe, Australia, and Northern and Latin America (Sutherland, 2014). Yet, as the importance of social protection and domestic revenue mobilization grows – as documented by the Sustainable Development Goals – a tool capable of describing and capturing (first-round) effects of tax-and-benefit policies in developing countries becomes ever more crucial.

A commonly debated, and in a few select countries already realized, social protection policy in the developing country context is a universal pension benefit. We use microsimulation models for Ecuador, Ghana, South Africa, and Tanzania to discuss the first-round effects of such policy on poverty and inequality, highlighting the versatility but also challenges when employing microsimulation models in a developing country context.

Our contribution to the literature is three-fold. First, we show how static tax-benefit microsimulation models can be used to evaluate ex ante the expansion of social protection policies in a developing country context in a static setting. Second, we contribute to the ongoing debate on poverty reduction in the developing world, and in particular among the elderly population. Third, our paper is the first using detailed static microsimulation models comparatively across different developing countries. We implement different scenarios, varying eligibility criteria and benefit amounts (tied to national or international benchmarks), maintaining or abolishing existing systems in countries where means-tested schemes for the elderly population already exist. Finally, we shed light on how costly such an intervention would be for countries.

We use tax-benefit microsimulation models for four countries, namely Ecuador (ECUAMOD), Ghana (GHAMOD), South Africa (SAMOD), and mainland Tanzania (TAZMOD),[1] all developed in the scope of the SOUTHMOD project (for more information see Decoster et al. (2018) and UNU-WIDER (2017)). Our choice of countries allows us to illustrate the hypothetical introduction of a uniform policy, an old-age universal pension, in four distinct settings. The four countries chosen are at different points in their economic development, three of them facing a stark increase in the share of the dependent elderly population, raising concerns regarding social protection for the elderly. The more economically advanced countries (Ecuador and South Africa) feature means-tested benefits for the elderly for the years analysed; but while the existing means-tested benefit in South Africa is rather loosely targeted and generous, the existing benefit in Ecuador is less generous and eligibility is based on a proxy means test (PMT).

The versatility of the EUROMOD software (University of Essex, 2017) allows us to model the different countries' tax-benefit systems taking into account existing contributory pension schemes and/or means-tested old-age benefits when implementing a hypothetical old-age pension reform (such as in Ecuador and South Africa). We vary the pension benefit amounts between 50 per cent of the National Poverty Line (NPL), 50 per cent of the National Food Poverty Line (FPL) or 50 per cent of the World Bank USD 3.1 a day line, as well as the age threshold (60 or 70) capturing national reference points as much as an international benchmark measure, and implementing more or less generous and thus costly reform scenarios. The models are also flexible in order to pick up one of the main conceptual differences between more or less developed countries when looking at distribution measures: while in the developing world (as in Ghana and Tanzania) poverty and inequality are measured based on consumption, such

[1] For simplicity 'Tanzania' is used when referring to mainland Tanzania in the following unless otherwise noted.

measures are typically based on income data in more developed countries (as in Ecuador and South Africa).

The introduction of a universal pension scheme lends itself readily as a suitable thought experiment for expanding social protection in developing countries for various reasons. First, it addresses an important and growing group of the population that is vulnerable to poverty in a context in which few old people are covered by contributory schemes. Second, such reforms are straightforward to implement in practice as no proxy means test or other targeting mechanism is needed in settings where administrative capacity and funds are often low. Other advantages of such a scheme include the transparent allocation mechanism and social acceptance of support for elders (as, for example, raised in the context of the Zanzibar universal pension (The Conversation, 2017).

For the purpose of this study, we implement a hypothetical universal non-means-tested old-age pension benefit for all citizens above a certain age in each of the four countries studied (Ecuador, Ghana, South Africa, and Tanzania) using the respective country's microsimulation model. Our results corroborate that the country context is crucial: in countries with no existing non-contributory schemes (such as Ghana and Tanzania), poverty and inequality decrease substantially at high cost for the government.

In countries with existing means-tested benefits for the elderly (such as Ecuador and South Africa), substituting means-tested benefits with universal benefits may entail lower poverty and inequality in settings in which the means-tested benefit fails to reach all of the poor (such as in Ecuador for certain reform scenarios) or if the benefits were less generous. By contrast, the proposed reform may entail significantly higher poverty and inequality in settings in which an on-average more generous and loosely targeted means-tested benefit already reaches the vast majority of the poor population, such as in South Africa.

The implications of maintaining the existing means-tested benefit and delivering the universal pension as a top-up scheme to the existing benefit also differ based on the existing tax-benefit systems. If the existing means-tested minimum pensions are generous and coverage is wide, as in South Africa, poverty and inequality are barely affected by a top-up scheme. If coverage is limited, as in Ecuador, top-up schemes nevertheless may have important positive effects on poverty and inequality. The above results abstract from any administrative costs involved in implementing benefits (universal or targeted). Based on the common assumption that targeted schemes are considerably more costly to administer and implement than universal schemes, universal schemes may also benefit from more efficient, transparent, and less costly implementation compared to targeted schemes.

We start in Section 2 with a discussion of different universal pension schemes and results from previous literature for the developing world. Section 3 introduces the four countries chosen, elaborates on their tax-benefit systems, and explains how the reforms are implemented in the SOUTHMOD microsimulation models. In Section 4 we present results on poverty and inequality, and implications for government expenditure. Section 5 concludes.

2 Universal pensions in the developing world

2.1 Universal pensions: a fluid concept that comes in various shapes

The term 'universal pension' is not clearly defined, nor is the related term 'minimum pension'. In its pure form a universal pension would be based on age, potentially also on citizenship and place of residence, but independent of the individual's income situation. By contrast, minimum pension schemes involve some kind of means test or targeting.[2]

'Pure' universal pensions, thus without applying any means test, are rare in practice. Different kinds of universal pension policies on a national level exist in New Zealand, Mauritius, Namibia, Botswana, Bolivia, Nepal, Samoa, Brunei, Kosovo, and Mexico (Willmore, 2007), on the sub-national level in Zanzibar (Galvani and Knox-Vydmanov, 2017) and on the district level, for example, in Uganda (Dietrich et al., 2017).

In recent years, universal pension policies have attracted attention in the scope of the ongoing debate on targeted versus universal benefits. Zanzibar is one of the most recent examples of implementing a 'pure' universal pension; first benefits were paid out in April 2016 to Zanzibar residents (or those who have been Zanzibar residents for over ten years continuously after age 18) 70 years or older (Galvani and Knox-Vydmanov, 2017). Most recently Kenya announced that, starting in 2018, every Kenyan aged 70 or older will be entitled to a monthly pension (HelpAge International, 2017a). In Zanzibar and Kenya the universal pension was introduced based on experience with prior pilot programmes.

Namibia, by contrast, has a long-standing universal pension that has been in force since 1994, but the origins of the scheme actually can be tracked back to before independence (Levine et al., 2011). South Africa features a minimum pension, thus a means-tested old-age pension, which will be discussed in detail below.

Mexico has a universal pension scheme that was first introduced in Mexico City in 2001. After 2013, all Mexican citizens aged 65 or older who do not receive any other (contributory) pensions are recipients of the non-contributory pension (Arza, 2017). Thus, the Mexican pension scheme is not a 'pure' universal pension. By contrast, Bolivia has a 'pure' universal pension scheme that has been in force since 1997, but the scheme has changed several times since its inception. Today, Bolivians aged 60 or older are eligible for the benefit (Arza, 2017). There are two benefit amounts: (1) a higher benefit for those who do not receive a contributory pension; and (2) a smaller benefit for those who also receive a contributory pension. The Bolivian universal pension scheme has the highest coverage in Latin America. In 2013, 96 per cent of the Bolivian elderly received the benefit.

2.2 Benefits of (universal) pensions in the developing world

Various studies confirm that universal and minimum pension schemes reduce poverty in developing countries, usually the first and foremost reason for the introduction of such schemes. For Namibia, one of the few countries with a universal pension in its pure form, Levine et al. (2011) show that the Old Age Pension lowers the probability of experiencing poverty. Effects of the pension on inequality are, however, not significant.

[2] See Willmore (2007) for a review of pension schemes in developing countries, including contributory systems.

The South African minimum pension scheme has reduced the number of South Africans living on less than USD 1 a day by 5 percentage points according to Case and Deaton (1998). Burns et al. (2005) analyse the distribution of household income with and without pension income and confirm this result. Using USD 1 per person per day as the poverty line, Jensen (2004) estimates that the minimum pension reduces the poverty rate of pensioner households by 26 percentage points.

Various microsimulation studies for Latin American countries conclude positive effects of universal and minimum pension schemes on poverty and inequality. This concords with the findings of various microsimulation studies for European countries and Australia on minimum pension schemes – see for example Tanton et al. (2009) for Australia; Atkinson et al. (2002) for the UK, France, Germany, Ireland, and Italy; and Figari et al. (2011) for 19 European Union member states.

Dethier et al. (2011) estimate effects of hypothetical pension reforms in 18 Latin American countries using microsimulation methods. They analyse both universal (thus not means-tested) pension schemes and minimum (thus means-tested) pension schemes using two different poverty line measures: (1) half of the median income; and (2) the USD 2 a day line. The minimum pension benefit is a top-up for existing pensions such that total pension benefits are equal to the poverty line. By contrast, the universal pension benefit is a lump-sum benefit (the amount of the poverty line) provided to all elderly. The authors conclude that a minimum pension reduces old-age poverty in all countries whenever a country has not implemented a universal minimum pension system. As expected, the poverty rates decline more in the case of universal pensions than in the minimum pension. They estimate that the relative cost of a minimum pension when using half of the median income poverty line ranges from 0.1 to 2.9 per cent of GDP across country; when using the USD 2 a day poverty line costs range from almost zero to 1.5 per cent of GDP.

Gasparini et al. (2010) also analyse hypothetical universal and minimum pension schemes for 19 countries in Latin America and the Caribbean. They estimate that both types of pension schemes reduce poverty, and find unsurprisingly that minimum income pensions cost less than universal schemes. Olivera and Zuluaga (2014) use microsimulation techniques for Colombia and Peru. They estimate that existing means-tested pension schemes reduce poverty of the total population by 0.7 percentage points in Colombia and 2 percentage points in Peru. The reduction is larger among the over-65 years old population and particularly in rural areas in both countries. The largest reduction of poverty rates at 24.8 percentage points occurs among Peruvians 65 years or older who live in rural areas. They find no impact on inequality except among the elderly population in Peru. The costs of the universal pension scheme are 2.6 and 2.98 per cent of total tax revenues in Colombia and Peru. For Ecuador, Amores and Jara (2018) show that increasing the existing targeted pension scheme in a revenue-neutral manner to match the level of the poverty line in Ecuador would reduce elderly poverty by 40 per cent and would take 18 per cent of old-age beneficiaries out of poverty.

Pension receipt (regardless of whether it is means-tested or universal) may affect not only the pension recipients' poverty and inequality status, but can also have impacts for the (often multi-generational) household overall. Bertrand et al. (2003) show that for South Africa pensions received through a means-tested pension also benefit other members of the family than just the pensioner. The pension also reduces the labour supply of household members aged 16–50 years, especially males. De Carvalho Filho (2012) shows that for Brazil an old-age benefit received by a household member increases 10- to 14-year-old girls' school enrolment but has no impact on enrolment rates of boys in that age group.

In a number of cases the above effects have been shown to vary with the gender of the recipient. In South Africa labour supply reductions on the household level are stronger when the recipient is female (Bertrand et al., 2003). For Brazil, De Carvalho Filho (2012) shows that households' girls' labour supply decreases if the pension recipient is female. Furthermore, Duflo (2003) estimates that in the case of a

female pension recipient the nutrition of and health of girls in the household improved but there was no significant effect on boys.

Some studies highlight that in a world where traditional support to elderly people is decreasing but countries are experiencing economic growth, providing a pension to the elderly is not only a means to ensure their material wellbeing. It can also ensure or restore the dignity of the elderly and their physical safety (e.g. witch killing in Tanzania (Miguel, 2005)).

2.3 Costs of (universal) pensions in the developing world

One of the main concerns in the ongoing debate on universal versus targeted benefits is of course the associated level of costs. There are different answers (if not opinions) to the question of which level of expenditure is sustainable. The assumptions made regarding the implementation of the benefit (in practice and in different analyses), the development of government revenue in the future, and government's revenue mobilization capacity, as much as governments' capacity to implement and administer certain reforms more or less cost efficiently, are often not spelled out clearly and are contested from either side.

Kakwani and Subbarao (2005) run simple simulations evaluating pension schemes in 15 African countries to calculate poverty rates and the costs of introducing universal pensions. Benefits are either 70 per cent of the national average poverty threshold or are restricted to sum up to no more than 0.5 per cent of GDP; the age threshold is either 60 or 65. They conclude that universal pension schemes are too expensive and recommend targeting pensions at the poor only. Also, Niño-Zarazúa et al. (2012) comment that a social program that cost 1 per cent of GDP would be hard to finance, given governments' often limited tax base and collection as much as limited institutional capacity.

A recent study by the ILO (Ortiz et al., 2017) estimates the cost of a universal pension for people aged 65 or older at 100 per cent of the NPL at 1.6 per cent of GDP in a sample of 57 lower-income countries, ranging from 0.1 per cent in Mongolia to 3.9 per cent in Bolivia. For 19 countries the estimated cost is below 1 per cent of GDP. These estimates include administrative costs assumed to amount to 3 per cent of the benefit expenditure. In their fiscal space analysis the authors put the expenditure for a set of universal benefits up against possible financing options such as taxes, development aid, debt services, reallocation of military spending, and curtailing illicit flows. They conclude that many countries would have the fiscal space available to develop social protection floors but that countries need to engage in a national dialogue to set the agenda for raising revenue and deciding which benefits to implement and/or expand.

In the case of Mauritius, for example, Soto et al. (2015) from the IMF argue that the country should reform its universal pension towards a targeted system as the IMF considers the universal pension to be unsustainable in terms of costs to the government. Spending is simulated based on pension expenditure and average wages, assuming full coverage by the universal pension, and real GDP growth and CPI inflation of 4 per cent. In this framework, expenditure on the universal pension is at 2.2 per cent of GDP in 2013, rising to approximately 6.5 per cent of GDP in 2040. Based on these simulations and predictions, the IMF judge the growth of expenditure on universal pensions as not sustainable given the current tax system and an ageing population.

Willmore (2006) opposes this view and finds that the Mauritian universal pension is affordable at 1.9 per cent of GDP in 2000. He uses the number of pension-age population and reported benefit amounts to estimate expenditure on the universal pension. He forecasts cost of between 1.9 and 4.8 per cent of GDP for the years 2010 to 2040, and considers those as affordable, given the predicted GDP growth.

The universal pension that was recently introduced in Zanzibar is the first government funded-universal pension in East Africa (Galvani and Knox-Vydmanov, 2017). The benefit amount is fixed at 50 per cent of the FPL, amounting to TZS 38,070 in 2016. The government budgeted TZS 6.5 billion in 2016/17 for starting the scheme. This is about 0.24 per cent of Zanzibar's GDP.

Beyond the expenditure spent on social benefits directly (universal or targeted), the administrative costs of implementing social protection policies are an important factor. As sketched out in a recent ILO report, costs arise at various points in the process of providing a benefit and relate to the design of the benefit, such as registration, eligibility testing in the case of a targeted benefit, benefit processing, etc. (Ortiz et al., 2017). Based on an extensive literature review, the authors estimate average administrative costs for universal benefits at 3 per cent of total expenditure and for targeted benefits at 11 per cent. While expenditure for a universal benefit is typically higher in a universal scheme compared to a targeted scheme, targeted schemes are obviously more demanding to implement as a more or less complicated (means) test must be administered. Dutrey (2007) discusses, based on several different schemes across the world, the considerable additional costs arising from identification of beneficiaries in the inception phase of a new program or when updating information on recipients in a running program. Both Ortiz et al. (2017) and Dutrey (2007) conclude that complementary to existing studies on country-specific programmes there is a need for 'systematic mapping of the administrative costs of social protection schemes' (Ortiz et al., 2017: 53).

Apart from higher administrative costs, implementation of means-tested benefits also requires considerably more administrative capacity, an often scarce resource in the developing world (Dutrey, 2007). Targeting is also associated with further (non-economic) costs such as stigmatization of the poor, corruption, excessive bureaucracy, incentive gaps, opaque systems in which eligibility criteria of means-tests are not clear, and/or people perceive the system as unfair when not all poor are included (Dutrey, 2007; Kidd et al., 2017; Willmore, 2007). For Tanzania, Wright et al. (2018) discuss in detail various factors that hinder the transparency of eligibility conditions for Tanzania's flagship social transfer programme. For South Africa, Willmore (2007) discusses how the loosely targeted Old Age Grant (OAG) is embedded into other tax legislation in such a way that turning it into a universal benefit may altogether not lead to higher costs (see Section 3.1).

Going beyond implementation and programme costs, proponents of universal benefits argue that the litmus test for a poverty-reducing benefit should be whether it actually achieves its goal. Brown et al. (2016) conclude that targeting methods rarely achieve poverty reduction goals. Dutrey (2007) points out that targeted programmes do not necessarily cover all poor or they include also non-poor, which makes targeting thus not always the most cost-efficient or politically suitable programme for poverty reduction.

3 Design of a universal pension reform and implementation across a selected set of countries

3.1 Ecuador, Ghana, Tanzania, and South Africa: similarities, commonalities, and characteristics of pension systems

Ecuador, Ghana, Tanzania, and South Africa make an interesting choice of countries for implementing a hypothetical universal pension for various reasons. Demographically and in terms of economic development, Ecuador and South Africa are more advanced compared to Ghana and Tanzania. And

while both of the latter countries have benefits for the elderly in place, the benefit design and therefore its implications vary distinctly across the two countries. While both system are on paper targeted, the system in Ecuador excludes a considerable share of poor elder citizens whereas the South African system is very loosely targeted and has very wide coverage. Ghana and Tanzania, by contrast, feature less developed social security systems but are in the process of building up social protection in general, but not with a specific focus on the elderly. Also, Ghana has seen greater economic improvements and a clear reduction in the dependency ratio of the young. In Tanzania, by contrast, the dependency ratio of the young has decreased far less than in the other three countries. We elaborate below on the different characteristics.

With the exception of South Africa, poverty is higher among those aged 65 or older than among the working-age population (see Table A1 in the Appendix). Poverty among the older population is lower than among children (below age 15) in all countries. The dependency ratio of the young (share of people younger than 15 out of the working-age population) has decreased considerably between 1993 and 2016 in Ghana (by 17 per cent), in Ecuador and South Africa (by 30 per cent, see Table A2 in the Appendix). It also decreased in Tanzania, but to a lesser extent (3 per cent, entire country). The reverse development has taken place for the dependency ratio of the elderly (share of population aged 65 or older); it increased over the same time span by 13 per cent in Tanzania, 9 per cent in Ghana, 41 per cent in Ecuador, and 29 per cent in South Africa. In all four countries the demographic developments thus clearly underline the growing importance and need for basic social safety for the elderly.

While Tanzania is classified as a low-income country by the World Bank, Ghana has attained lower middle-income country status (see Table 1). As common in many developing countries, Ghana and Tanzania both measure poverty using consumption. The latest headcount poverty rate stands at 24.4 per cent in Ghana (2013) and at 28.2 per cent in Tanzania (2012). Tax and benefit systems are rather simple, and due to a large informal sector coverage by contributory pensions systems is low and mainly restricted to government employees.

Ghana has three contributory pension schemes of which two are mandatory and one is voluntary for formal sector employees. The pension received out of the contributory system depends on the amount of contributions and the number of years of contribution (Adu-Ababio et al., 2017). The two mandatory contributory systems in place are the Social Security and National Insurance Trust (SSNIT), the main system for private sector employees, civil and public servants, self-employed, farmers, artisans, professionals, and traders; there is another scheme for military, police, and civil servants. Coverage through these schemes reaches a mere 10 per cent of the labour force (Stewart and Yermo, 2009). Outside the public pension scheme, elderly people may qualify for the LEAP (Livelihood Empowerment Against Poverty) benefit, a means-tested benefit provided to the poorest of the country and also available for those 65 years or older with limited economic capacity. The programme was in the process of being rolled out in 2013 and has seen extensions in scope and generosity since then.

Mainland Tanzania operates several contributory pension schemes, yet with low coverage overall that is often complex and fragmented (Leyaro et al., 2017). Thus, only few elderly have access to a pension. The Productive Social Safety Net (PSSN) programme started in 2012 and two cash transfer elements have been subsequently rolled out from 2014 on to all of mainland Tanzania. Both elements are means-tested; the fixed basic cash transfer addresses poor families, whereas the variable conditional cash transfer is targeted at families with children. Old age features neither as part of the eligibility criteria nor as a dedicated benefit rate in this programme. For this study we consider the tax-benefit system in 2012, thus before the PSSN cash transfer schemes were fully rolled out.

Ecuador and South Africa are upper middle-income countries with more developed tax-benefit systems. Poverty is typically measured (as in developed countries) based on disposable income. The latest head-

count poverty rate is 23.1 per cent from June 2017 in Ecuador (using the NPL) and latest estimate for South Africa from 2015 (using the ZAR 992 poverty line) by Statistics South Africa (2017) is 55.5 per cent. Both countries provide a more (South Africa) or less (Ecuador) generous means-tested benefit to the elderly population.

South Africa provides a minimum pension, the so-called Old Age Grant (OAG). Eligibility is based on age (60 years or older) and income; a single person with income below ZAR 64,680 per year and couples with income below ZAR 129,360 per year qualify. In 2014 the minimum benefit amount is ZAR 100 per month, the maximum is ZAR 1,410 per month (Wright et al., 2016). Practically, the OAG is targeted to poorer African elderly households since the majority of the white elderly population does not pass the means test and is thus not eligible (Case and Deaton, 1998). The most recent estimates put coverage through the OAG at 74 per cent of the population aged 60 or above (HelpAge International, 2017b). Willmore (2007) classifies the targeting of the OAG as 'loose targeting designed to exclude the affluent rather than restrict payments to those in poverty' (Willmore, 2007: 38). The OAG coexists with a tax relief for the wealthy whose budgetary costs have been estimated to be so high that the Taylor Commission recommended unifying both schemes into a universal benefit (Willmore, 2007). Furthermore, Willmore (2007) argues that targeting gives arbitrary decision-making power to government bureaucrats which makes corruption easier and the system less transparent.

Moreover, South Africa has two contributory pension schemes: (1) an occupational scheme and (2) a personal retirement scheme. Both schemes are voluntary (Stewart and Yermo, 2009). The occupational retirement scheme is voluntary in the sense that employers can decide (1) whether to set up such a fund in the first place, and (2) which employees are to participate in the fund. The mandatory participation of workers makes the scheme actually quasi-mandatory. The personal retirement scheme is basically a voluntary retirement savings scheme with tax incentives. South Africa's National Treasury (2004) estimates the coverage of the occupational schemes to lie between 66 and 84 per cent of workers in the formal sector.

Ecuador features a means-tested pension benefit for the elderly, embedded into a broader means-tested benefit, the so-called HDT (Human Development Transfer or Bono de desarrollo humano (BDH)). In the scope of the HDT an individual that scores below a certain threshold value in the Social Registry (a composite index of socioeconomic variables) and is 65 years or older is entitled to USD 50 per month in 2014 (Jara et al., 2017). The contributory pension system consists of a general regime and a regime specific to the armed forces and national police. The combined coverage for the contributory and the non-contributory means-tested pension systems stood at 62 per cent of the population aged 65 or above in 2013 (HelpAge International, 2017b). Bargain et al. (2017) document the degree of inequality reduction through the tax-benefit system in Ecuador and illustrate that particularly the HDT for seniors plays an important role. Amores and Jara (2018) analyse different revenue-neutral expansions of the old-age component of the HDT. They illustrate for three different scenarios how more generous benefits can lift a significant share of elderly out of poverty financed by a considerable increase in social insurance contributions. In general, Ecuador features a more redistributive tax-benefit system than most Latin American countries and public spending on social assistance conditional cash transfers is high compared to other Latin American countries.

3.2 Implementation of a universal pension reform across countries

For the purpose of this study we define 'universal pension' as a benefit paid to all citizens residing in the country of a certain age or higher. No means-test is applied and no prior contribution history to a public scheme (if such exists) is required. For illustrative purposes we vary the age threshold (60 and 70 years) and the benefit amount. Making a sensible choice of benefit amount across countries remains

a somewhat arbitrary judgement. We therefore show results for three different benefit amounts which relate to benchmark values that are either nationally defined or internationally set:

1. 50 per cent of the national poverty line,
2. 50 per cent of the national food poverty line,
3. 50 per cent of the World Bank USD 3.10 a day line (WBPL) (World Bank, 2017).

Table 1 shows the different poverty lines and the respective benefit amounts and age thresholds used in the three chosen reform scenarios. Reform scenarios were chosen such that they encompass a generous benefit with wide coverage (reform 1: 60 years or older and half the NPL) and a limited benefit with low coverage (reform 2: 70 years or older and half the FPL). The internationally more comparable WBPL measure used in reform 3 lies in between the other two national scenarios (reforms 1 and 2) regarding benefit generosity for Ghana and Ecuador. In Tanzania the World Bank line is above the national benchmarks; reform 3 is thus more generous than reforms 1 and 2. In South Africa, the WBPL lies below the national benchmarks and reform 3 is therefore the least generous.

National poverty lines are typically based on the level of food consumption considered physically necessary according to nutritional standards. The FPL is therefore usually constructed from consumption of calories per day (see, for example, Table A8.2 in Ghana Statistical Service (2014b) for recommended energy intakes in Ghana). The NPL includes on top of food consumption the basic non-food amenities. Assumptions regarding nutritional necessities underlying the FPL and NPL, food and non-food items, and their quantities used for poverty line estimates can vary across countries.

In Ghana, the FPL (referred to as the lower or extreme poverty line) is based on 2,900 calories per adult equivalent per day (Ghana Statistical Service, 2014b). The calorie amount is multiplied by the calorie price. In 2012/13 the FPL was set at Ghanaian cedi (GHS) 66 per month, which amounts to 27.1 per cent of the mean consumption level. The NPL (referred to as the upper poverty line) consists of the FPL plus basic non-food consumption. The FPL was set at GHS 109.5 per month, which is 44.9 per cent of the mean consumption level in 2012/2013.

In Tanzania, the FPL is based on expenditure for 2,200 calories of food consumption per day (NBS, 2014), which adds up to Tanzanian shilling (TZS) 26,085.5 per month. The NPL (referred to as the basic needs poverty line) is derived from the FPL by scaling it up by a factor of 1/0.715, which brings the NPL to TZS 36,482 per month. Both poverty lines are constructed based on 2012 surveys.

In South Africa, we use the FPL of 645 South African Rand (ZAR) per month (referred to as the lower bound poverty line), which is based on the cost of 2,100 calories per day (Budlender et al., 2015; Statistics South Africa, 2015). Unlike in other countries, this FPL also includes some basic non-food amenities. The FPL strictly speaking would thus be lower than the line we use. However, Statistics South Africa (2015) argues that the FPL without non-food items is extremely low and that even the level of the FPL is so low that individuals' basic food and non-food needs are not covered. The NPL is ZAR 1,252 per month, which contains the FPL and the average amount of non-food expenditure. The targeted OAG is substantially larger than all three hypothetical universal pension scenarios. From calculations of simulated OAG benefits, over 95 per cent of the OAG recipients are provided a benefit amount greater than ZAR 1,300 per month.

In Ecuador, the poverty line is based on the fifth round of the Encuesta de Condiciones de Vida (ECV) from 2006, based upon which the cost of a basket of goods and services including housing, health, and education services is derived. The cost is updated on a yearly basis. For 2014 the FPL (referred to as the extreme poverty line) was defined at USD 45.67 and the NPL at USD 81.04. The hypothetical benefit

provided is lower in any of the three scenarios than the amount (USD 50) currently provided through the means-tested scheme.

Table 1: Characteristics of simulated reforms and poverty lines

	Ghana	Tanzania	Ecuador	South Africa
Simulated year	2013	2012	2014	2014
World Bank country classification by income	Lower middle	Low	Upper middle	Upper middle
Poverty lines:				
National poverty line (NPL, food poverty line plus basic amenities)	109.5	36,482	81.0	1,252.0
Food poverty line (FPL)	66.0	26,086	45.7	642.0
World Bank USD 3.1 a day line (WBPL)	84.9	53,571	52.7	505.1
Benefit amounts in reform scenarios:				
Reform 1:≥60, 50% NPL	54.8	18,241	40.5	626.0
Reform 2:≥70, 50% FPL	33.0	13,043	22.8	321.0
Reform 3:≥60, 50% WBPL	42.4	26,786	26.4	252.6

Notes: All monetary values in national currency units and per month. World Bank USD 3.1 a day line is converted to national currencies using PPP conversion factors of simulated year: (1) GHS 0.9 per USD (2) TZS 568.143 per USD, (3) USD 0.559 per USD (USD is Ecuador's national currency), and (4) ZAR 5.357 per USD.
Source: authors' compilation based on data of country classification, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups; and PPP conversion factors, https://data.worldbank.org/indicator/PA.NUS.PPP

3.3 The SOUTHMOD microsimulation models for Ecuador, Ghana, Tanzania, and South Africa

We use fully fledged static microsimulations for Ecuador (ECUAMOD), Ghana (GHAMOD), Tanzania (TAZMOD), and South Africa (SAMOD) to simulate the hypothetical universal pension reforms discussed above. The respective country reports discuss in full detail how the different tax-benefit reforms are implemented in the microsimulation models (Jara et al., 2017; Adu-Ababio et al., 2017; Leyaro et al., 2017; Wright et al., 2016).

All models are based on nationally representative household surveys using probabilistic sampling designs. The surveys capture a broad picture of the demographics, labour market situation, income, and consumption of household members in the different countries. GHAMOD uses the Ghana Living Standards Service Survey Round 6 (GLSS 6) from data collection years 2012/13 (Ghana Statistical Service, 2014a). The GHAMOD database consists of 72,372 individuals living in 16,772 households. TAZMOD uses the 2011/12 Household Budget Survey (HBS 6th round) of Tanzania mainland (NBS, 2014) based on probabilistic sampling. TAZMOD is based on 46,593 individuals living in 10,186 households. For South Africa we use SAMOD based on the National Income Dynamics Study (NIDS) 2014/15 Wave 4 Version 1.1, as published by DataFirst in 2016 (Southern Africa Labour and Development Research Unit (SALDRU), 2016). The database covers 11,895 households and is nationally representative. ECUAMOD uses the National Survey of Income and Expenditures of Urban and Rural Households (Encuesta Nacional de Ingresos y Gastos de Hogares Urbanos y Rurales, ENIGHUR), collected in 2011/12, with monetary values uprated to 2014 as the tax-benefit system as of 2014 is analysed (Ecuador National Statistical Institute, 2012). The survey is nationally representative following a probabilistic two-stage sample design. The ECUAMOD database consists of 153,341 individuals living in 39,617 households.

All models capture income taxes, turnover taxes, social security contributions, VAT and excise taxes, other relevant taxes, and benefits as far as the underlying data allow (for more details see the respective country reports for ECUAMOD (Jara et al., 2017), GHAMOD (Adu-Ababio et al., 2017), Tanzania (Leyaro et al., 2017), and South Africa (Wright et al., 2016)). As all models are based on the EUROMOD software, concepts and variables are implemented in a comparable manner based on the SOUTHMOD modelling conventions (see Sutherland and Figaro (2013) for an overview of the state of EUROMOD in European countries). Across all four countries pension receipt through existing contributory schemes is not simulated as the underlying data lacks information on contribution records. Instead, we use the information on contributory pensions received as reported in the data. For South Africa the not fully mandatory occupational pension scheme is not simulated due to lack of information in the underlying data. The means-tested benefits accruing to elderly people in South Africa (the OAG benefit) and the portion of the means-tested benefit accruing to elderly people in Ecuador (as part of the HDT policy) are modelled in SAMOD and ECUAMOD respectively (Jara et al., 2017; Wright et al., 2016).

The models are subject to some general and specific limitations that are more or less important for the simulation of universal pensions. A general concern across countries is the non-filing of tax returns while the models assume full compliance for those working in the formal sector. Informality also may hamper the quality of income data. As our analysis centres on the introduction of a benefit and abstracts from the financing of the policy, this is of limited concern as long as we are comparing the poverty and inequality outcomes of the simulation to the model baseline scenario. That said, the model baseline scenarios for poverty and inequality perform fairly close to values from external sources (see the country reports cited above for more detail, specifically the sections on 'Summary of "health warnings"').

Some specific observations are worth mentioning. The monetary variables in the input data for ECUAMOD are adjusted to 2014 but no adjustments have been made for potential demographic or labour market changes taking place between the time of data collection in 2011/12 and 2014. Also, the surveys for Ghana and Tanzania ask respondents to state the amount of pay they receive for their work and how often they are paid (hourly, daily, weekly, monthly, etc.). When converting incomes to yearly values a few cases show improbably high amounts, given respondents' education and skill level. In Tanzania the pattern is particularly salient for low-skilled respondents reporting an hourly or daily frequency of pay but with full-time work hours working throughout the full year. Classifying these cases as data entry issues, the payments were reclassified as monthly if the pay exceeded TZS 5,000 per day or TZS 100,000 per week. Furthermore, income was censored at the 99th percentile. A similar strategy was chosen for Ghana, where a small number of cases similarly exhibited an improbable mismatch between the frequency of pay, the amount paid, and the sector. Therefore the status of the job (private sector formally employed, publicly employed, non-agricultural self-employed, etc.) was used to censor improbable income values at the 99th percentile for each subgroup.

Differential implementation of a uniform reform across countries

Working with a fully fledged microsimulation model for each country, we can take into account the characteristics of the existing benefit systems described above. We therefore can implement the universal pension differently for Ghana and Tanzania than for Ecuador and South Africa, countries where a means-tested minimum pension already exists. For Ghana and Tanzania, we only restrict receipt of the universal pension benefit to those not receiving a public pension (if such a scheme exists in the country), regardless of the amount received from the contributory scheme.

For Ecuador and South Africa, we implement the reforms discussed above for two different scenarios. In the first scenario we abolish the existing means-tested pension scheme and introduce a universal pension benefit. All citizens aged 60/70 or above receive the same benefit amount, regardless of the amount they

received before. In the second scenario we implement a universal pension so that no one is made worse-off. We keep the existing means-tested minimum pension schemes in place and on top we introduce the universal pension. Those elderly who do not receive the minimum pension receive the full universal pension benefit. Recipients of the existing minimum income pension who receive a smaller amount under the minimum income pension than under the universal pension benefit from a top-up. Thus for them, the universal pension benefit amount is the difference between the universal pension and existing pension. Recipients of the minimum pension with a larger minimum income pension than universal pension benefit are not entitled to the universal pension benefit.

Measuring poverty and inequality across countries

We use the headcount and poverty gap indicators out of the Foster–Greer–Thorbecke family of poverty measures (FGT(0) and FGT(1)) to analyse poverty. The headcount index, FGT(0), measures the proportion of individuals whose income or expenditure is below the poverty line. The poverty gap index, FGT(1), measures the average of poverty gaps divided by the poverty line. In addition, we measure inequality using the Gini coefficient, which takes values between 0 and 1; 0 denotes perfect equality and 1 absolute inequality in terms of earnings. We show these measures across the total population and among recipients.

Estimated poverty rates depend on the chosen poverty line. In the developing country context, absolute poverty lines are usually used and countries define their own poverty lines, often calorie-based (see Section 3.2). Other absolute measures are more easily compared across countries, such as the USD 1–2 a day line (e.g., Case and Deaton, 1998; Dethier et al., 2011). Yet, they usually are less established in the national debate. In developed countries, by contrast, relative poverty lines are commonly used, often fixed at 40–60 per cent of the mean or median equivalized disposable household income (e.g., Atkinson et al., 2002; Dethier et al., 2011; Tanton et al., 2009). We show poverty results using NPLs in order to retain easy comparability to the countries' benchmark poverty rates.

Another factor affecting distributional measures such as poverty and inequality is the choice of the equivalence scale used to convert household-level income/consumption. Across countries the definition of equivalence scale varies. Ghana (Ghana Statistical Service, 2014b) and Tanzania (NBS, 2014), for example, both use a calorie-based equivalence scale but the amount of calories assumed necessary for adults of a certain age is not identical across both countries. Ecuador and South Africa, by contrast, attribute the same weight to each household member, unlike the different OECD scales that attribute a higher weight to the first and grown-up household members. This approach also differs from the square root approach currently used by the OECD (OECD, 2017). We use countries' chosen equivalence scales discussed above so that our results are readily comparable to countries' baseline results.

In microsimulation models hypothetical policy scenarios affect the disposable income through higher or lower tax payments or benefit receipts. Distributional measures such as poverty and inequality are calculated based on the disposable income. This is the usual approach in developed countries, which we follow for Ecuador and South Africa, where poverty is estimated based on income.

In many developing countries, including Ghana and Tanzania, by contrast, poverty is measured based on consumption.[3] The universal pension we simulate increases disposable income. While we could show poverty based on income (using imputed values for own produce) this would stop short of providing meaningful poverty estimates. We therefore resort to constructing 'consumption possibilities', a concept

[3] This is due to lack of income data and many people living on subsistence farming. But poverty measures based on consumption rather than income also provide different information, see for example the work by Meyer and Sullivan (2009).

intended to capture the increase or decrease in consumption possibilities due to an increase or decrease of disposable income.

Specifically, we use the consumption observed in the data (and used by the national statistical authorities to compute poverty), subtract actual transfers received, and instead add simulated transfers (see Adu-Ababio et al. (2017) for more details). Similarly, we add actual taxes and social security contributions paid and subtract simulated taxes and social security contributions. With perfect data and no hypothetical reforms, we thus should end up with a value of 'consumption possibilities' equal to the consumption observed in the data. This approach produces consumption poverty rates that are close to the measures based on consumption observed in the data (for example, 24.9 vs 24.2 per cent in Ghana). It is worth noting that even if consumption possibilities-based poverty would deviate more, this has limited implications for comparing poverty across scenarios: assuming that people would consume any additional income (which is rather likely in a developing country context), actual taxes and transfers would cancel out the difference between a reform scenario and the baseline scenario.

4 Main findings

4.1 Characteristics of recipients and importance of the benefit

Table 2: Characteristics of recipients of universal pensions in different reform scenarios in Ghana and Tanzania

	Ghana			Tanzania		
	Reform 1 ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
Age	71	78	71	71	78	71
Share of males (%)	44.2	43.0	44.2	47.6	46.6	47.6
Household size	4.6	4.5	4.6	5.6	5.7	5.6
Share with no primary education (%)	56.5	69.8	56.5	55.2	66.0	55.2
Benefit as share of equivalized consumption (%)	39.9	25.5	31.0	41.5	30.7	60.9
Recipients out of total population (%)	6.6	3.3	6.6	5.8	2.8	5.8
Share of recipients in age group (%)	96.9	97.3	96.9	99.4	99.6	99.4

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line.
Source: authors' own calculations.

A universal pension would as per its rules benefit the older population, on average about 70 years old in the schemes with eligibility for those 60 years or older. Average age of the eligible in reform 2 that addresses those 70 or older is about 78 (Tables 2 and 3). Given lower life expectancy, more females than males would benefit and average household size of the beneficiaries ranges from 3.4 in Ecuador to 5.7 in Tanzania. More than half of beneficiaries have not completed primary education.

Table 2 shows the characteristics of the elderly population in Ghana and Tanzania for the different hypothetical reforms. Recipients constitute only a rather small part of the total population, ranging between 2.8 (reform 2, Tanzania) and 6.6 per cent (reform 1, Ghana). Among the elderly population, coverage, by contrast, is high, with more than 95 per cent of elderly covered by any of the three reforms. This high coverage with a hypothetical universal pension is the flip side of low coverage by the existing con-

Table 3: Characteristics of recipients of universal pension in different reform scenarios in Ecuador and South Africa

	Ecuador			South Africa		
	Reform 1 ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
Age	70	78	70	69	77	69
Share of males (%)	45.9	44.0	45.9	40.1	34.7	40.1
Household size	3.6	3.4	3.6	4.3	4.4	4.3
Share with no primary education (%)	61.5	74.2	61.5	48.1	53.8	48.1
Recipients out of total population (%)	8.3	3.8	8.3	8.1	3.1	8.1
Share of recipients in age group, scenario 1 (%)	81.3	76.3	81.3	100.0	100.0	100.0
Benefit as share of equivalized income, scenario 1 (%)	37.5	23.7	24.5	58.2	31.2	23.5
Share of recipients in age group, scenario 2 (%)	51.3	32.7	51.3	14.4	10.7	12.5
Benefit as share of equivalized income, scenario 2 (%)	35.5	23.3	23.3	7.5	3.5	3.0

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line.
Source: authors' own calculations.

tributory pension schemes. The universal pension benefit amount as a share of equivalized consumption is above 25 per cent in any of the reform scenarios and reaches more than 60 per cent in Tanzania for reform 3, where the benefit is the more generous and the age group larger (60 years or older) than under reforms 1 and 2. In both countries possible trickle-down effects to the rest of the household could be important as the elderly recipients live in households on average composed of more than four persons and often spanning three generations.

Unlike in Ghana and Tanzania, a targeted benefit for the elderly already exists in Ecuador and depending on how the universal pension interacts, generosity and coverage of the universal pension vary. In Ecuador, coverage and the universal pension as a share of the equivalized income diverge considerably between reforms under scenario 1 and scenario 2 (Table 3). As coverage through a contributory scheme is largest in Ecuador out of all countries analysed, the lowest share of the senior population, between 75 and 81 per cent, would receive the universal pensions in scenario 1 when substituting the existing means-tested system with a universal system. This drops to about half or one-third in scenario 2, where the existing means-tested benefit is maintained and the universal pension is provided as a top-up. As the lump-sum benefit of USD 50 provided in the existing scheme is larger than any of the benefits provided under the different reform scenarios, the universal pension covers exclusively those seniors that are not entitled to the means-tested benefit.

The universal pension equals between 37.5 (reform 1) and 23.7 per cent (reform 2) of equalized income in scenario 1. This is somewhat lower under scenario 2 with 35.5 and 23.2 per cent respectively. Eligibility to the existing means-tested benefit is restricted to those scoring below a certain threshold value in the Social Registry, which is composed of not only income but also a host of other socio-economic variables. Thus, apart from limiting the scope of reach by fixing the threshold value, determinants other than the income situation determine eligibility. The universal benefit, by contrast, goes to everybody regardless of income and other socio-economic variables. Thus the universal benefit reaches many income-poor people who do not qualify for the means-tested benefit.

As in Ecuador, South Africa provides a means-tested benefit to the elderly. Yet, unlike in Ecuador, the benefit is targeted so loosely that the introduction of the universal benefit either has a large (scenario 1)

or very little impact (scenario 2) on coverage and benefit amounts. In South Africa, coverage through the universal pension reaches 100 per cent of the relevant senior population when substituting the existing targeted system (scenario 1) as no contributory scheme as such is simulated for South Africa. Coverage by the hypothetical universal pension drops to between 11 and 14 per cent (reform 1 and reform 3) in scenario 2 where the existing, targeted OAG is maintained and topped up by the universal pension. The means-tested OAG benefit is loosely targeted and generous. The majority of the elderly population benefits and the benefit is slowly phased out until reaching the rather high upper eligibility threshold which is high compared to the benefits handed out in the reform scenario. In scenario 2 the majority of seniors therefore retain the means-tested benefit and the universal pension benefit goes only to the better-off part of the elderly population. This also shows in the impact of the universal pension on equivalized income; in scenario 1 the universal pension constitutes between 23.5 (reform 3) to 58.2 per cent (reform 1), thus a very substantial contribution under reform 1. Under scenario 2 this plummets to between 3 and 7.5 per cent as a comparatively much better-off group receives the universal pension that equals a considerably smaller part of their income.

4.2 Poverty and inequality

Poverty and, second to that, inequality reduction are often the main motivation for the introduction of universal benefits. In Ghana and Tanzania our simulations confirm that in a static setting both poverty and inequality, as measured by the Gini index, are reduced among the group of the eligible as much as among the population overall. The picture is more nuanced in Ecuador and South Africa, where a more or less generous, large-scope means-tested benefit for the elderly is in place. The implemented reforms are not revenue-neutral; see Section 4.3 for a discussion of budgetary implications. The results also assume no leakage and do not take into account either the costs associated with implementation and administration of the hypothetical reforms or any of the administrative costs associated with the existing systems.

Table 4: Ghana: poverty and inequality indicators

		Ghana			
		Status quo	Reform 1 ≥60, 50% NPL	Reform 2 ≥70, 50% FPL	Reform 3 ≥60, 50% WBPL
Total population	**FGT(0)**	0.249	0.238	0.245	0.240
	FGT(1)	0.084	0.078	0.082	0.079
	Gini	0.427	0.422	0.425	0.423
Beneficiaries of reform 1	**FGT(0)**	0.247	0.188		
	FGT(1)	0.082	0.056		
	Gini	0.438	0.423		
Beneficiaries of reform 2	**FGT(0)**	0.271		0.230	
	FGT(1)	0.088		0.068	
	Gini	0.435		0.426	
Beneficiaries of reform 3	**FGT(0)**	0.247			0.200
	FGT(1)	0.082			0.060
	Gini	0.438			0.426

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line.
Source: authors' own calculations.

In Ghana and Tanzania, poverty and inequality decrease across all three hypothetical reforms (see Table 4 for Ghana and Table 5 for Tanzania), unsurprisingly most among the beneficiary group. As expected, the biggest decrease is for the reform reaching the most people (thus those 60 years or older) and offering

the most generous pension amount; that is, reform 1 in Ghana and reform 3 in Tanzania. In Ghana, reform 1 reduces headcount poverty by 24 per cent and the poverty gap by 32 per cent in the recipient group; the pattern is similar for reform 1 in Tanzania. Reform 3 in Tanzania reduces poverty even more, namely headcount poverty by 33 per cent and the poverty gap by 42 per cent. The poverty reduction among the elderly also impacts poverty among the population overall; in Tanzania, headcount poverty (the poverty gap) decreases by 4.25 per cent (7.2 per cent) in reform 1 and by 6.7 per cent (9.6 per cent) in reform 3.

Effects on inequality are sizeable as well, with equality falling by 1.2 per cent in Ghana with reform 1 (3.4 per cent in the recipient group). In Tanzania, where inequality among the older population is already under the status quo lower than among the total population (0.371 vs 0.416), inequality decreases overall but even more so for the elderly population.

Table 5: Tanzania: poverty and inequality indicators

		Tanzania			
		Status quo	Reform 1 ≥60, 50% NPL	Reform 2 ≥70, 50% FPL	Reform 3 ≥60, 50% WBPL
Total population	**FGT(0)**	0.293	0.280	0.288	0.273
	FGT(1)	0.072	0.067	0.070	0.065
	Gini	0.416	0.413	0.415	0.412
Beneficiaries of reform 1	**FGT(0)**	0.287	0.221		
	FGT(1)	0.070	0.047		
	Gini	0.371	0.360		
Beneficiaries of reform 2	**FGT(0)**	0.312		0.268	
	FGT(1)	0.079		0.061	
	Gini	0.352		0.346	
Beneficiaries of reform 3	**FGT(0)**	0.287			0.194
	FGT(1)	0.070			0.041
	Gini	0.371			0.356

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line.
Source: authors' own calculations.

Unlike in Ghana and Tanzania, Ecuador and South Africa both feature existing minimum pensions whose characteristics differ markedly. Poverty and inequality outcomes therefore differ significantly depending on how the proposed universal pension interacts with the existing system in each country. The upper panel of Table 6 for Ecuador and Table 7 for South Africa show the results for the status quo and the different reforms for scenario 1 in which the existing means-tested benefit is abolished and a universal pension introduced. We also provide a scenario of the status quo in which the existing minimum pension policy is 'turned off' as an alternative comparison (column 'status quo 2'). The lower panel of Tables 6 and 7 shows results for scenario 2 in which no one loses the existing benefit but instead the universal benefit is handed out as a top-up to those in receipt of the existing benefit and in full to all seniors not covered by the existing minimum pension.

In Ecuador, in scenario 1 (full substitution of the existing minimum pension) only reform 1, the most generous reform, reduces poverty rates and inequality compared to the status quo ('status quo 1'); this holds for both the population overall and the beneficiary group (decrease of FGT(0) by 12 per cent and of FGT(1) by 19 per cent). While the benefit in reform 1 is the most generous out of all reforms, it is still lower than the current targeted benefit. Yet the current benefit has a considerably lower coverage than the universal pension benefit. Reform 2 provides a universal benefit about one-third lower than the current targeted benefit, and poverty and inequality increase both among the total population and in the beneficiary group. Reform 3 has almost no impact on the distributional outcomes in the population compared to the status quo (benefit amount between reform 1 and 2). All reforms reduce poverty and inequality though if compared to 'status quo 2', thus comparing the distributional outcomes of the reforms with a situation in which the existing minimum pension scheme is abolished.

In scenario 2 (lower panel of Table 6), all reforms reduce poverty and inequality compared to the status quo. In sum, this illustrates that the existing means-tested minimum pension scheme in Ecuador does not capture all poor seniors. The top-up universal pension, by contrast, reaches those elderly citizens and therefore poverty and inequality decrease. The largest decrease in poverty and inequality is again observed for reform 1 in the recipient group, where headcount poverty decreases by 19 per cent, the poverty gap by 33 per cent, and inequality decreases by 2.9 per cent.

In South Africa, the existing means-tested pension scheme is generous and loosely targeted, and thus more akin to the coverage of a universal pension, unlike the targeting of the minimum pension in Ecuador. Therefore, abolishing the existing pension scheme (scenario 1, see upper panel of Table 7) and introducing a universal pension leads for all hypothetical reforms to an increase of poverty and inequality compared to the status quo with a targeted minimum pension. The negative impacts are highest among the beneficiary group in reform 3 (lowest benefit amount). The picture changes to the opposite if comparing to a scenario in which the existing minimum pension scheme would be abolished (column 'status quo 2'); in such a scenario a universal pension would across all different hypothetical reforms lead to decreases in poverty and inequality for all groups analysed. Reform 1, as the most generous scheme, would reduce headcount poverty by 1.6 per cent, the poverty gap by 7.2 per cent, and inequality by 1.5 per cent (respectively by 6.5, 29, and 4.5 per cent in the beneficiary group).

In scenario 2 (lower panel of Table 7, the universal pension topping up the existing scheme), the universal pension scheme would barely affect poverty and inequality in South Africa in a static setting. As discussed in Section 4.1, the universal pension in such a scenario would mainly benefit the better-off parts of the elderly population in this setting and therefore not contribute to poverty reduction. Inequality would barely change either, or if at did, would be increased.

Table 6: Ecuador: poverty and inequality indicators

		Ecuador				
		Status quo 1 existing benefit on	**Status quo 2** existing benefit off	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
Scenario 1: abolishing existing benefit						
Total population	**FGT(0)**	0.160	0.169	0.155	0.165	0.160
	FGT(1)	0.048	0.056	0.046	0.052	0.049
	Gini	0.460	0.465	0.458	0.463	0.460
Beneficiaries of reform 1	**FGT(0)**	0.208	0.271	0.183		
	FGT(1)	0.067	0.129	0.054		
	Gini	0.529	0.555	0.519		
Beneficiaries of reform 2	**FGT(0)**	0.268	0.369		0.313	
	FGT(1)	0.083	0.191		0.127	
	Gini	0.493	0.534		0.514	
Beneficiaries of reform 3	**FGT(0)**	0.208	0.271			0.215
	FGT(1)	0.067	0.129			0.077
	Gini	0.529	0.555			0.533
Scenario 2: maintaining existing benefit						
Total population	**FGT(0)**	0.160	0.169	0.153	0.156	0.155
	FGT(1)	0.048	0.056	0.045	0.046	0.046
	Gini	0.460	0.465	0.457	0.458	0.458
Beneficiaries of reform 1	**FGT(0)**	0.208	0.271	0.169		
	FGT(1)	0.067	0.129	0.045		
	Gini	0.529	0.555	0.514		
Beneficiaries of reform 2	**FGT(0)**	0.268	0.369		0.248	
	FGT(1)	0.083	0.191		0.069	
	Gini	0.493	0.534		0.486	
Beneficiaries of reform 3	**FGT(0)**	0.208	0.271			0.183
	FGT(1)	0.067	0.129			0.051
	Gini	0.529	0.555			0.519

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line.
Source: authors' own calculations.

Table 7: South Africa: poverty and inequality indicators

		South Africa				
		Status quo 1 existing benefit on	**Status quo 2** existing benefit off	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
Scenario 1: abolishing existing benefit						
Total population	**FGT(0)**	0.570	0.598	0.589	0.597	0.596
	FGT(1)	0.298	0.349	0.324	0.344	0.339
	Gini	0.651	0.675	0.664	0.673	0.672
Beneficiaries of reform 1	**FGT(0)**	0.460	0.650	0.608		
	FGT(1)	0.198	0.454	0.322		
	Gini	0.645	0.734	0.701		
Beneficiaries of reform 2	**FGT(0)**	0.490	0.676		0.653	
	FGT(1)	0.224	0.475		0.411	
	Gini	0.588	0.691		0.683	
Beneficiaries of reform 3	**FGT(0)**	0.460	0.650			0.644
	FGT(1)	0.198	0.454			0.399
	Gini	0.645	0.734			0.734
Scenario 2: maintaining existing benefit						
Total population	**FGT(0)**	0.570	0.598	0.570	0.570	0.570
	FGT(1)	0.298	0.349	0.298	0.298	0.298
	Gini	0.651	0.675	0.652	0.651	0.651
Beneficiaries of reform 1	**FGT(0)**	0.460	0.650	0.459		
	FGT(1)	0.198	0.454	0.198		
	Gini	0.645	0.734	0.648		
Beneficiaries of reform 2	**FGT(0)**	0.490	0.676		0.490	
	FGT(1)	0.224	0.475		0.224	
	Gini	0.588	0.691		0.590	
Beneficiaries of reform 3	**FGT(0)**	0.460	0.650			0.460
	FGT(1)	0.198	0.454			0.198
	Gini	0.645	0.734			0.646

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line.
Source: authors' own calculations.

4.3 Expenditure analysis

The flip side of reducing poverty and inequality through a universal pension scheme is the associated costs for government. Table 8 shows the size of expenditure for the different reforms for Ghana and Tanzania, and Table 9 shows the same for Ecuador and South Africa. The presented expenditure numbers abstract from any administrative costs that might be associated with the implementation of the policy (see Section 2.3 for a discussion and cost estimates).

Across countries the costs vary from between 0.16 per cent (reform 2, scenario 1 in Ecuador) to 1.29 per cent of GDP (reform 3 in Tanzania). Costs relative to government revenue span from 0.41 to 8.68 per cent (same cases as before). Expenditure on the universal pension as a share of government revenue is higher for Ghana and Tanzania than for Ecuador and South Africa, which is in line with greater domestic revenue mobilization capacities in the latter countries; the tax base in Ghana and in Tanzania is considerably smaller than in Ecuador, and especially compared to South Africa. The weaker domestic revenue mobilization capacities of Ghana and Tanzania also show in the ratio of costs relative to total direct taxes raised, varying from 1 per cent (reform 2, scenario 1 in South Africa) to 33.1 per cent (reform 3 in Tanzania).

The poverty gap in the eligible age group shows the budget necessary to lift everyone in that group out of poverty, assuming perfect targeting. Also, for a given level of poverty reduction universal pension reforms, by definition, are substantially more costly than a perfectly targeted means-tested pension benefit. Comparing the cost of the universal pension with the poverty gap is thus a helpful exercise to contrast the cost of a universal pension benefit against the theoretical scenario of a perfectly targeted benefit. Across different reform schemes the costs for a universal pension are between half (reform 3, scenario 1, South Africa) and more than ten-fold the poverty gap (reform 1, Tanzania).

In both Ghana and Tanzania, the limited domestic revenue and greater poverty pose challenges to the poverty-reducing effects of the universal pension. In Ghana, expenditure for the most expensive reform stands at 18.36 per cent of total direct tax receipts (reform 1) and in Tanzania it stands at 33.09 per cent (reform 3), which is a massive share of tax revenue. Costs for the least expensive reform stand at 5.56 per cent of total direct tax receipts in Ghana and 7.83 per cent in Tanzania (both reform 2). In both countries it would obviously be much cheaper to close the poverty gap through perfect targeting instead of a universal pension. Yet, a well-targeted and transparent means-tested pension scheme is a challenging endeavour, potentially expanding administrative costs and bureaucracy significantly. A transparent and fair implementation may be near impossible if administrative data quality is mixed (see Section 2.3 for a discussion of difficulties in the implementation of targeted schemes). For Tanzania, Wright et al. (2018) discuss in detail various factors that hinder the transparency of eligibility conditions to Tanzania's flagship social transfer programme.

Table 9 shows expenditure on the universal pension reforms in Ecuador and South Africa when substituting the existing means-tested pension schemes entirely with a universal pension scheme (scenario 1). In Ecuador, reform 1 is the most expensive and expenditure on a universal pension as a share of total direct tax receipts is 14.82 per cent. Reform 1 is thus more costly than the existing means-tested pension scheme, which amounts to 0.27 per cent of GDP but excludes many poor elderly. Reform 2 is the cheapest and less costly than the existing means-tested pension scheme. For scenario 2 (universal pension as a top-up to the existing means-tested scheme), expenditure is accordingly lower (see Table A3 in the Appendix).

In South Africa, reform 1 is the most expensive but it would cost less than the existing generous loosely targeted minimum pension scheme (see Table 9). The OAG features high coverage and larger benefit amounts than assumed in reform 1. Therefore, all universal pension reforms would be cheaper than the

existing means-tested pension schemes, whose costs stand at 1.58 per cent of GDP. Willmore (2007) also documents that the costs for the targeted benefit are so important that turning the existing system into a universal pension might actually generate fiscal savings. The fact that the South African system is near universal also shows in scenario 2 (universal pension as a top-up to the existing means-tested scheme, see Table A3 in the Appendix), with very low costs as very few additional seniors would become eligible under such a scenario.

Table 8: Expenditure on the universal pension, consumption-based countries

	Ghana			Tanzania		
	Reform 1 ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
As share of GDP (%)	1.24	0.37	0.96	0.88	0.31	1.29
As share of government revenue (%)	7.40	2.24	5.75	5.91	2.05	8.68
As share of total direct tax receipts (%)	18.36	5.56	14.25	22.53	7.83	33.09
Expenditure on universal pension (millions)	1,157.23	350.26	898.30	539,254.82	187,394.64	791,854.06
As share of closing the poverty gap in age group (%)	861.61	432.20	622.93	1,047.75	575.60	1,782.65

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line. In the calculations for closing the poverty gap we use NPL. All monetary values in national currency units.
Source: authors' own calculations.

Table 9: Expenditure on the universal pension, income-based countries, scenario 1 (abolishing existing means-tested pension schemes)

	Ecuador			South Africa		
	Reform 1 ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
As share of GDP (%)	0.60	0.16	0.39	0.89	0.17	0.35
As share of government revenue (%)	1.58	0.41	1.03	2.34	0.47	0.94
As share of total direct tax receipts (%)	14.82	3.83	9.70	5.15	1.03	2.08
Expenditure on universal pension (millions)	616.85	159.42	403.42	32,723.09	6,539.76	13,199.01
As share of closing the poverty gap in age group (%)	873.23	201.65	408.92	155.06	62.38	50.57
As share of the existing means-tested pension (%)	219.73	56.79	143.70	54.36	10.86	21.93

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line. In the calculations for closing the poverty gap we use NPL. All monetary values in national currency units.
Source: authors' own calculations.

5 Conclusions

Social protection is on the rise in the developing world. This paper uses the hypothetical introduction of a universal old-age pension to discuss the implications of such policy for Ecuador, Ghana, Tanzania, and South Africa. We use novel, fully fledged tax-benefit microsimulation models to illustrate how universal pensions affect poverty, inequality, and expenditure. The effects vary greatly depending on the country context, existing tax-benefit systems, the design of the universal pension reform, and how the latter interact.

We find that in countries with no scheme specifically geared towards the senior population, as in Ghana and Tanzania, poverty and inequality clearly fall in the recipient group and across the population. Effects are substantial and their scope depends critically on whether the benefit amount is anchored to the NPL, the FPL, or the WBPL. In countries with existing means-tested minimum pensions, like Ecuador and South Africa, results differ markedly depending on the implementation of the universal pension. Substituting the existing loosely targeted generous means-tested old-age benefit with a universal pension increases poverty and inequality in South Africa. In Ecuador, where not all poor seniors are covered by the existing means-tested old-age benefit, the most generous of the studied universal pension reforms would lead to less poverty and inequality. If existing systems are maintained, top-up universal pension schemes considerably reduce poverty and inequality in Ecuador, but less so in South Africa given its generous and large-scope minimum pension. In sum, considering the implementation of a universal pension across these four different countries highlights the importance of taking into account the national context.

Costs vary with the degree of generosity and scope of coverage of the universal pension between 0.17 and 1.29 per cent of GDP. Expenditure as a share of government revenue also varies largely with countries' domestic revenue mobilization capacities across countries. The debate on what level of expenditure is sustainable and whether universal benefits are 'too expensive' rests on many assumptions. Fully fledged microsimulation models, such as those employed here help to inform the debate regarding the details of how a specific policy (such as a universal pension) could be implemented and how it might interact with other parts of the tax code. Such models also allow clear statements about the assumptions made due to their level of detail.

The above analysis raises the question of how countries could finance such a reform. While revenue-neutral reforms can be implemented in the model, such a step requires a lot more country-specific assumptions. Furthermore, the results presented in this paper are based on static microsimulation models. We thus abstract from any behavioural changes that the introduction of a universal pension might have on people's behaviour. Behavioural responses to policy reforms is an area of ongoing research; in a developing country context, for example, Osei et al. (2018) discuss one possible dimension of behavioural change when implementing a revenue-neutral expansion of social protection for Ghana. The role of administrative efficiency and capacity for the implementation and thus the cost of implementing different reforms is also an ongoing research area relevant to our work. As Wright et al. (2018) show, transparency and clarity of social protection rules is another important area of research. Finally, deepening the comparability across countries, including more countries, and addressing the discrepancies between income- vs consumption-based distributional measures remain high on the research agenda.

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Appendix

Table A1: Headcount ratios for subgroups of population (FGT(0))

Age group	Ghana	Tanzania	Ecuador	South Africa
0–14	0.295	0.330	0.223	0.702
15–64	0.218	0.262	0.123	0.514
65->	0.257	0.296	0.195	0.489

Notes: estimates are calculated using the NPLs.
Source: authors' own calculations.

Table A2: Dependency ratios (%)

	Old		Young	
	1993	**2016**	**1993**	**2016**
Ghana	5.4	5.8	80.2	66.8
Tanzania	5.3	6.0	89.4	87.0
Ecuador	7.5	10.7	63.7	44.6
South Africa	6.1	7.9	63.6	44.5

Notes: ratio of dependents to the working-age population, those aged 15–64. Old dependents defined as those older than 64 years; young dependents defined as younger than 15 years. World Bank staff estimates based on age distributions of United Nations Population Division's World Population Prospects.
Source: World Development Indicators.

Table A3: Expenditure on the universal pension, income-based countries, scenario 2

	Ecuador			South Africa		
	Reform 1 ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL	**Reform 1** ≥60, 50% NPL	**Reform 2** ≥70, 50% FPL	**Reform 3** ≥60, 50% WBPL
As share of GDP (%)	0.38	0.07	0.25	0.11	0.02	0.04
As share of government revenue (%)	1.00	0.18	0.65	0.30	0.05	0.11
As share of total direct tax receipts (%)	9.36	1.64	6.12	0.66	0.11	0.25
Expenditure on universal pension (millions)	389.34	68.39	254.63	4,194.51	698.30	1,592.36
As share of closing the poverty gap in age group (%)	659.44	155.29	380.32	32.43	12.22	12.31
As share of the existing means-tested pension (%)	138.69	24.36	90.70	6.97	1.16	2.65

Notes: NPL = national poverty line, FPL = food poverty line, WBPL = World Bank USD 3.10 a day line. In the calculations for closing the poverty gap we use NPL. All monetary values in national currency units.
Source: authors' own calculations.